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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,585	06/15/2005	Xavier Vilanova	932.1308	9053

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EXAMINER	
SIEVERS, LISA C	
ART UNIT	**PAPER NUMBER**
2863	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,585	VILANOVA ET AL.	
	Examiner	Art Unit	
	Lisa C. Sievers	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 October 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. If applicant desires to claim the benefit of a prior-filed application under 35 U.S.C. 119(e), a specific reference to the prior-filed application in compliance with 37 CFR 1.78(a) must be included in the first sentence(s) of the specification following the title or in an application data sheet. For benefit claims under 35 U.S.C. 120, 121 or 365(c), the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of the applications.

If the instant application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or 120, where applicable, within this time period is considered a waiver of any benefit of such prior application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A benefit claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed benefit claim under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional. The petition

should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

If the reference to the prior application was previously submitted within the time period set forth in 37 CFR 1.78(a), but not in the first sentence(s) of the specification or an application data sheet (ADS) as required by 37 CFR 1.78(a) (e.g., if the reference was submitted in an oath or declaration or the application transmittal letter), and the information concerning the benefit claim was recognized by the Office as shown by its inclusion on the first filing receipt, the petition under 37 CFR 1.78(a) and the surcharge under 37 CFR 1.17(t) are not required. Applicant is still required to submit the reference in compliance with 37 CFR 1.78(a) by filing an amendment to the first sentence(s) of the specification or an ADS. See MPEP § 201.11.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 (amended), 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rose-Pehrsson et al. (5469369) in view of Zuckerman (4423407).

With respect to claims 1 (amended), 6 and 7, Rose-Pehrsson et al. (5469369) teaches a system [figure 1] for the detection of hazardous vapors utilizing a surface acoustic wave (SAW) transducer. Rose-Pehrsson et al. (5469369) teaches the claimed "carrier gas" ("gas stream consists of carrier gas... which can be delivered with or without the test vapor," Rose-Pehrsson et al. (5469369), col. 4, lines 63 – 66), "plurality of detecting means" ("sensor array [figure 1 (14)] comprising at least two sensors,"

Rose-Pehrsson et al. (5469369), col. 49, lines 54 – 55), "calibrating means" (A known pattern vector of sensor responses to gas is processed, and if the gases present are misidentified, the system performs iterative calculations using a correction factor until gases are identified correctly; Rose-Pehrsson et al. (5469369); col. 16, lines 59 - 67), and "means for processing and control of acquisition and data recognition, ...wherein said system [figure 1] implements calibrations in an automated way that is transparent to a user/operator of said system [figure 1]," ("microprocessors [figure 1 (22)] are used to control the sampling system [figure 1 (12)], to collect and process frequency data, and to implement the pattern recognition algorithm... to determine if a hazard is present;" Rose-Pehrsson et al. (5469369); col. 12, lines 60 – 64; col. 16, lines 59 - 67), "wherein said system [figure 1] includes means [figure 2 (24)] for connecting said carrier gas to a measuring chamber [figure 2 (14)] which contains said sensors" (Rose-Pehrsson et al. (5469369), figures 1 and 2), "and wherein said means of processing and control include a system of real-time recognition of said gases" ("the pattern recognition algorithm must be applied immediately to determine if a hazard is present.... These calculations can be done either by a separate microcomputer receiving real time frequency data from the instruments via the serial port or by the microcontroller built into the instruments." Rose-Pehrsson et al. (5469369), col. 26, lines 53 - 61), "which provides a diagram with delimited decision zones, in which the measurements taken on said carrier gas are situated and identified." ("[Figure 8] shows two vapor responses [60] and [62]" which "cluster in [separate regions] of space [64]." Furthermore, "a discriminant function is found that separates one class or cluster [64] from another." (Rose-Pehrsson et al. (5469369); figure 8; col. 14, line 44 – 49)

With respect to claim 6 alone, Rose-Pehrsson et al. (5469369) additionally teaches "wherein said processing and control means include a microprocessor [22] that corrects temporary deviations of the sensor responses" ("Signals are determined by comparing sensor [responses] during direct sampling with the stored baseline [responses]. To compensate for slow baseline drift.... [previous] results are used to decide if the sample air contains any hazards. If not, the [responses] obtained in the preceding direct sampling mode can be taken as baseline [responses];" Rose-

Pehrsson et al. (5469369); col. 29, lines 15 – 22) "and controls and processes the data that permit detection of the presence of reducing and/or oxidizing gases at various pre-established levels." (a microprocessor is used to process sensor response data where response intensity is "used to determine the level of the hazard (high, medium, or low warning)," Rose-Pehrsson et al. (5469369), col. 11, lines 27 - 32)

With respect to claim 7 alone, Rose-Pehrsson et al. (5469369) additionally teaches "wherein said connecting means comprise a plurality of electrically operated valves" ("electronics of the system further include... control circuitry for the valves [32]," Rose-Pehrsson et al. (5469369), col. 13, lines 15 – 17) "and connecting pipes to permit the carrier gas or calibrated gases to flow through the chamber that contains the sensors." ("the sampling system [12] consists of a sampling manifold [24] [and] a small pump to pull samples through the sensor array [14]," Rose-Pehrsson et al. (5469369), col. 4, lines 49 - 51)

With respect to claims 1 (amended), 6 and 7, Rose-Pehrsson et al. (5469369); col. 14, lines 44 – 49; col. 15, lines 26 - 28) Rose-Pehrsson et al. (5469369) fails to teach the use of "sensors based on semiconductor-type metal oxides that work in the absence of oxygen."

Zuckerman (4423407) teaches an "analyzing system for the detection of oxidizing... gases... wherein said gas-detection means are sensors based on semiconductor-type metal oxides that work in the absence of oxygen" (tin – tin oxide sensor element [30] situated in a system [figure 5] designed, in one embodiment, to detect and monitor levels of chlorine gas; Zuckerman (4423407); col. 12, lines 3 – 5; col. 11, lines 46 – 57). Though Zuckerman (4423407) proposes the use of the chlorine sensor in an air environment, Zuckerman (4423407) does not say that an air environment is an absolute requirement and Zuckerman (4423407) states, "[The] chlorine sensor does not response adversely to... oxygen." (Zuckerman (4423407), col. 12, lines 25 – 27) Conceivably, the chlorine sensor of Zuckerman (4423407) is able to function also in alternative environments that do not include oxygen. Zuckerman (4423407) suggests that reducing gases may also be detected by the system. Zuckerman (4423407) states, "The principles of [the] invention are applicable to other

metal, metal oxide systems.... The selection of the metals is a function of the gas that is desired to be measured." Zuckerman (4423407), col. 12, lines 3 – 10). "[A] class of sensors for combustible gas was developed using metal and metallic oxides." (Zuckerman (4423407), col. 1, lines 40 – 42)

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have substituted the sensor [Zuckerman (4423407), figure 5, (30)], and corresponding signal output processors [Zuckerman (4423407), figure 5, signal conditioning circuit (36) and variable gain differentiator system (40)], suggested by Zuckerman (4423407) for the SAW sensor array [Rose-Pehrsson et al. (5469369), figure 1, (14)] of Rose-Pehrsson et al. (5469369) because the sensor [Zuckerman (4423407), figure 5, (30)] suggested by Zuckerman (4423407) provides "a very substantial and very rapid resistance change within the first few seconds of exposure to the subject gas" (Zuckerman (4423407), col. 9, lines 35 – 38), enabling the variable gain differentiator system [Zuckerman (4423407), figure 5, (40)] to "[look] primarily at relatively rapid change in the conditioned sensor signal. This eliminates changes in the condition sensor signal due to environmental factors such as humidity and temperature." (Zuckerman (4423407), col. 10, lines 34 – 40) Rose-Pehrsson et al. (5469369) notes that the "sensors may [show an abrupt change in baseline on valve switching] to the extent that they are sensitive to humidity changes" (Rose-Pehrsson et al. (5469369); col. 7, lines 64 – 67; col. 8, lines 1 – 5) and that "temperature variations [also] contribute to baseline drift." (Rose-Pehrsson et al. (5469369), col. 12, lines 34 – 35)

3. Claims 2 and 3 (amended) are rejected under 35 U.S.C. 103(a) as being unpatentable over Rose-Pehrsson et al. (5469369) in view of Zuckerman (4423407) as applied to claim 1 (amended) above, and further in view of Llobet et al.

With respect to claims 2 and 3 (amended), Rose-Pehrsson et al. (5469369) further teaches including a "calibration means include a plurality of patterns or calibrated

gases at least equal in number to the number of reducing and oxidizing gases that have to be detected in the carrier gas," (Rose-Pehrsson et al. (5469369) "requires that a training set of vapor response data be collected for analysis" in order to calibrate the system for accurate toxic vapor determinations. Table 2 exemplifies the patterns, or calibrated gases, used for this purpose and the number of patterns exceeds the number of gases to be detected; Rose-Pehrsson et al. (5469369); table 2; col. 13, lines 48 – 59) "wherein the response of the plurality of sensors to the measurements of patterns includes the obtaining of a vector... for each calibrated gas or standard." (the use of a data matrix with rows of pattern vectors where each element in the row vector corresponds to a sensor response with 1 – N elements, and N is the number of sensors in the sensor array [14]; Rose-Pehrsson et al. (5469369); figure 1; col. 15, lines 1 – 8) Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) fail to teach a "vector of conductance variation." While Zuckerman (4423407) monitors sensor resistance, conductance variation, defined by the applicant as the difference between base sensor conductance in a pure gas and the measured sensor conductance in the presence of a contaminant, is not monitored.

Llobet et al. teaches a thick-film tin oxide gas sensor for monitoring ethanol, toluene, and o-xylene. Conductance variations (ΔG), "the difference between the sensor conductance when exposed to the reducing vapors and the steady-state has been reached and the sensor conductance in dry air," are taken for each gas or mixture thereof, as are "conductance rise [times] measured from 20 to 60% of ΔG." (Llobet et al., page 971, col. 2, mid page) These values are used in principle component analyses "to evaluate and compare the discriminatory ability of the [sensor] array for the three studied compounds." (Llobet et al., page 972, col. 1, upper page)

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have substituted the conductance variation and conductance rise time values of Llobet et al. into the sensor response elements of the pattern vector of the system taught and made obvious by Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) in order to implement the pattern recognition algorithm because,

when used together, steady-state conductance variations and transient conductance rise times lead to an improved level of classification accuracy over using solely sensor resistances when analyzing results. (Llobet et al., page 972, col. 2, mid page)

With respect to claim 3 (amended), Rose-Pehrsson et al. (5469369) further teaches a "plurality of patterns or calibrated gases," ("a training set of vapor response data" for calibrating the system; Table 2 exemplifies the patterns, or calibrated gases, used for this purpose; Rose-Pehrsson et al. (5469369); Table 2; col. 13, lines 48 – 59) and "wherein said recognition system comprises obtaining a learning matrix resulting from grouping the... vectors of the measurements taken with the plurality of patterns or calibrated gases." (a data matrix with rows of pattern vectors where each element in the row corresponds to a sensor response, Rose-Pehrsson et al. (5469369); col. 15, lines 1 – 8) Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) fail to teach the use of "conductance variation" values within the learning matrix. While Zuckerman (4423407) monitors sensor resistance, conductance variation, defined by the applicant as the difference between base sensor conductance in a pure gas and the measured sensor conductance in the presence of a contaminant, is not monitored.

Llobet et al. teaches a thick-film tin oxide gas sensor for monitoring ethanol, toluene, and o-xylene. Conductance variations (ΔG), "the difference between the sensor conductance when exposed to the reducing vapors and the steady-state has been reached and the sensor conductance in dry air," are taken for each gas or mixture thereof, as are "conductance rise [times] measured from 20 to 60% of ΔG." (Llobet et al., page 971, col. 2, mid page) These values are used in principle component analyses "to evaluate and compare the discriminatory ability of the [sensor] array for the three studied compounds." (Llobet et al., page 972, col. 1, upper page)

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have substituted the conductance variation and conductance rise time values of Llobet et al. into the sensor response elements of the pattern vectors within the learning matrix of the system taught and made obvious by Rose-Pehrsson et

al. (5469369) and Zuckerman (4423407) in order to implement the pattern recognition algorithm because, when used together, steady-state conductance variations and transient conductance rise times lead to an improved level of classification accuracy over using solely sensor resistances when analyzing results. (Llobet et al., page 972, col. 2, mid page)

4. Claims 4 (amended) and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rose-Pehrsson et al. (5469369) in view of Zuckerman (4423407) and Llobet et al. as applied to claim 3 (amended) above, and further in view of Lewis et al. (5959191).

With respect to claims 4 (amended) and 5, Rose-Pehrsson et al. (5469369), Zuckerman (4423407), and Llobet et al. taught "wherein said recognition system identifies the measurements taken in the carrier gas, according to [step 1 of] the algorithm [stated in claim 4 (amended)]:"

(1) "obtaining a vector of conductance variation for the plurality of sensors that make up the system."

With respect to claim 5 alone, Rose-Pehrsson et al. (5469369) additionally teaches "wherein the type of response identified by the system includes the responses of pure carrier gas, contaminated carrier gas at alert level due to at least one contaminant and contaminated carrier gas at alarm level due to at least one contaminant." ("Decisions about the presence of absence of hazards can be displayed on a panel on the sensor system [and/or] used to activate an alarm [Rose-Pehrsson et al. (5469369), figure 1, (56)]," Rose-Pehrsson et al. (5469369), col. 12, lines 64 – 66)

With respect to claims 4 (amended) and 5, Rose-Pehrsson et al. (5469369), Zuckerman (4423407), and Llobet et al. fail to teach the remaining steps of the algorithm [stated in claim 4 (amended)]:

(2) "auto scaling of the vector with the mean values and variances used to auto scale the learning matrix obtained from the patterns or calibrated gases,"

(3) "projecting the auto scaled vector onto the space of the principal components extracted on the basis of the learning matrix obtained with the calibration means,"

(4) "in function of the position occupied by said vector, the system identifies a type of response."

Lewis et al. (5959191) teaches a system with "sensor arrays for detecting an analyte in a fluid for use in conjunction with an electrical measuring apparatus" (Lewis et al. (5959191); figure 1B; col. 3, lines 38 – 41) "Fluids may be liquid or gaseous in nature" and may include a wide variety of essentially reducing gases. (Lewis et al. (5959191), col. 8, lines 1 and 28 – 38) Data obtained from exposures of the sensor array to analytes are compiled in a matrix with each row representing one exposure and each column representing a measured resistance. The matrix is then autoscaled in the following manner: (Lewis et al. (5959191), col. 9, lines 43 – 56)

> further processing (19). In this preprocessing technique, all the data associated with a single descriptor (i.e. a column in the data matrix) were centered around zero with unit standard deviation
>
> $$d'_{ij}=(d_{ij}-\bar{d}_i)/\sigma_i \quad (1)$$
>
> where $\bar{d}_i$ is the mean value for descriptor i and σ_i is the corresponding standard deviation.

After more processing, the data are projected onto the space of the principal components and the system determines the identity of the substances yielding particular sensor responses. (Lewis et al. (5959191); figure 9; col. 9, lines 57 – 67; col. 10, lines 1 – 22)

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have substituted the steps of autoscaling, principle component analysis, and gas identification from sensor responses of Lewis et al. (5959191) into the data processing of the learning matrix and pattern vectors carried out under the system taught and made obvious by Rose-Pehrsson et al. (5469369), Zuckerman (4423407), and Llobet et al. because it is "useful to [then] express the results of the principle component analysis in terms of physical parameters" which can be accomplished "via a multi-linear least square fit between the principle component values and the

corresponding parameter of interest.... [resulting] in a linear combination of the principle components and [yielding] the best fit to the corresponding parameter value." (Lewis et al. (5959191), col. 10, lines 23 – 31)

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rose-Pehrsson et al. (5469369) in view of Zuckerman (4423407) as applied to claim 1 (amended) above, and further in view of Kurokawa et al. (6679097 B2).

With respect to claim 8, Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) teach the invention except "wherein the carrier gas is carbon dioxide."

Kurokawa et al. (6679097 B2) teaches a system and method for "monitoring a concentration of oxygen in a beverage production process" (Kurokawa et al. (6679097 B2), col. 9, lines 34 – 37) wherein carbon dioxide or nitrogen gas, along with gas from the inside of a bottle, are delivered to a measuring apparatus. (Kurokawa et al. (6679097 B2), col. 5, lines 49 – 61).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have substituted the carbon dioxide carrier gas of Kurokawa et al. (6679097 B2) for the carrier gas of Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) because, when the system is applied to the beverage industry, carbon dioxide will not affect the flavor of the beverage. (Kurokawa et al. (6679097 B2), col. 2, lines 1 – 3)

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rose-Pehrsson et al. (5469369) in view of Zuckerman (4423407) as applied to claim 1 (amended) above, and further in view of Visser et al.

With respect to claim 9, Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) teach the invention except "wherein utilization of the gas sensor based on semiconductor-type metal oxides is proposed for detecting reducing and oxidizing gases present in a carrier gas, in the absence of oxygen."

Visser et al. teaches a sensing device [figure 1] "which can measure combustibles in the absence of oxygen in the measurement gas." (Visser et al., page 555, col. 1, lower page) The device includes an aperture [a] leading into a housing space [v] containing a semiconductor-type sensing element [S] and a ZrO2 electrochemical cell. The measurement gas enters the housing space [v] through aperture [a] of the sensing device. Inside, a current is passed through the ZrO2 cell, which is exposed to the measurement gas on one side and regular air on another side. The result is a pumping of oxygen molecules through the ZrO2 cell from the regular air side into the sensor housing space [v] where the semiconductor-type sensing element [S] utilizes the pumped oxygen to produce a strong signal. (Visser et al.; page 555; col. 1, lower page; col. 2, upper page)

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to have substituted the gas sensor proposed for detecting combustibles in a carrier gas, in the absence of oxygen, of Visser et al. for the sensor described by Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) because, "there are several applications... where [a] measurement gas contains only very small or variable amounts of oxygen.... One example is the automotive engine exhaust gas sensing application." (Visser et al., col. 1, mid page) "In many combustion processes... it is frequently desirable to continuously measure the fuel composition. When the fuel consists of many components, this measurement requires rather sophisticated analytical techniques. In some cases, however, it is possible to determine the fuel composition with relatively simple and inexpensive solid state sensors of the type described" by Visser et al. (Visser et al., page 556, col. 2, mid page)

Response to Arguments

7. Applicant's arguments filed on 10/24/2006 have been fully considered.

With respect to the claimed benefit of priority, the reference to 119(e) may be disregarded as it applies to provisional applications. In order to obtain the benefit of

priority of foreign patent application SPAIN P-200300003 (filed on 1/2/2003), the benefit of priority of PCT/IB03/06442 (filed on 12/23/2003) must be properly claimed. Presently, both SPAIN P-200300003 and PCT/IB03/06442 are claimed in the declaration. While 35 USC 119(a)–(d) (applicable to SPAIN P-200300003) does not require that a specific reference be included in the first sentence of the specification or in an application data sheet, 35 USC 120 (applicable to PCT/IB03/06442) does. In compliance with CFR 1.78(a), the applicant is required to submit a reference to PCT/IB03/06442 by filing an application data sheet or by filing an amendment to the first sentence(s) of the specification. See MPEP 201.11 under 37 CFR 1.78(a)(2)(iii).

With respect to claim 1 (amended), the applicant states that Rose-Pehrsson et al. (5469369) teaches a system where the learning process must be supervised wherein there can be no automated recalibration of the system. Recalibration is not pertinent to claim 1 (amended), however, Rose-Pehrsson et al. (5469369) does provide for correction of sensor baseline drift over time. (Rose-Pehrsson et al. (5469369), col. 29, lines 15 – 27) The amendment to claim 1 provides for a system which "implements calibrations in an automated way" wherein the automation is "transparent to a user/operator of said system." The calibrations of Rose-Pehrsson et al. (5469369) are implemented by the system and involve the use of a microprocessor to perform programmed operations that result in the system's calibration. (Rose-Pehrsson et al. (5469369); col. 12, lines 60 – 64; col. 16, lines 59 - 67) The operations and calculations occur without the step-by-step intervention of an operator and therefore can be considered automatic and transparent.

With respect to claim 1 (amended), the applicant states that the claimed invention is capable of performing calculations on the order of ms, thereby providing real-time recognition of gases. The applicant further states that the invention of Rose-Pehrsson et al. (5469369) may begin to process data in real-time but may not complete the processing quickly enough to provide real-time recognition of gases. The limitation of processing on the order of ms is not present in claim 1 (amended) and therefore this

timeframe is not pertinent. Rose-Pehrsson et al. (5469369) teaches real-time recognition of gases, specifying a processing time of less than 2 seconds. (Rose-Pehrsson et al. (5469369), col. 26, lines 53 – 61; col. 29, lines 28 – 35)

With respect to claim 1 (amended), the applicant states that Rose-Pehrsson et al. (5469369) teaches both the possibility of and away from exposing the sensors in the array directly to sample air. This limitation is not pertinent to claim 1 (amended).

With respect to claim 1 (amended), the applicant disagrees with the Examiner's contention that Zuckerman (4423407) teaches "sensors based on the semi-conductor-type metal oxides that work in the absence of oxygen." The applicant states that the sensors of Zuckerman (4423407) were only known at the time the present invention was made to work in the presence of oxygen. While the Examiner acknowledges that Zuckerman (4423407) indicates one application of the sensor for detecting object gases (e.g., chlorine) in an air environment, Zuckerman (4423407) does not recite that oxygen is required in order for the sensor to detect an object gas. Zuckerman (4423407) outlines a manufacturing process intended to limit the formation of oxide within a sensor and describes sensor operation at temperatures intended to limit the oxidation of the metal at a significant rate. A proposed chemical mechanism describing how the sensor functions to detect an object gas is also provided. (Zuckerman (4423407), col. 7, lines 6 – 43; col. 8, lines 22 – 60) The objective is stated as having the sorption reaction between the object gas and sensor dominate the monitored changes in resistance of the sensor. As such, the "chlorine sensor does not respond adversely to... oxygen." (Zuckerman (4423407), col. 12, lines 25 – 27) This would seem to suggest that the sensor will function in approximately the same fashion in an environment with or without oxygen. The applicant states that before the claimed invention, no sensors were known, based on semiconductor-type metal oxides, that permitted the detection of reducing and oxidizing gases in the complete absence of oxygen in a carrier gas atmosphere or current. It is not clear how the applicant's claimed invention has overcome the teachings of the cited prior art. In order to potentially overcome the rejection of claim 1

(amended), the applicant would need to provide more detail on the claimed sensor (e.g., sensor structure, sensor component composition, chemical mechanisms responsible for sensor detection, and suggestive evidence/data regarding claimed functionality in the absence of oxygen). The obviousness combination of Rose-Pehrsson et al. (5469369) and Zuckerman (4423407) meets the current limitations of the applicant's claimed invention as recited in the claims and as described in the specification. Additionally, Visser et al. as applied to claim 9, provides an alternative description of a sensor for measuring combustibles in the absence of oxygen.

With respect to claim 1 (amended), the applicant states that Rose-Pehrsson et al. (5469369) relies on SAW sensors whose replacement with semiconductor sensors that rely on electrical conductivity of the sensors like those in Zuckerman (4423407) would not create a viable system. Rose-Pehrsson et al. (5469369) describes a gas sensing device with the preferred embodiment incorporating SAW sensors, however, Rose-Pehrsson et al. (5469369) also presents an alternative embodiment incorporating chemiresistors. (Rose-Pehrsson et al. (5469369), col. 8, lines 35 – 50) Given the suggested alternative embodiment, the system of Rose-Pehrsson et al. (5469369) appears to be compatible with the sensors taught by Zuckerman (4423407).

Regarding the matters stated above, the rejection of claim 1 (amended) is maintained. The rejections of claims 2 – 9 are also maintained.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lisa C. Sievers whose telephone number is (571) 272-8052. The examiner can normally be reached on M-F, 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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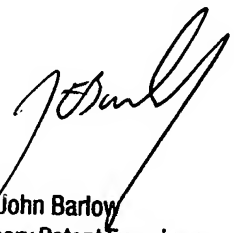

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